

REMARKS

The Office Action dated September 4, 2008 has been carefully considered. The following remarks are being submitted as a full and complete response thereto. Authorization is granted to charge counsel's Deposit Account No. 01-2300, referencing Attorney Docket No. 030687-00566, for any additional fees necessary for entry of this Response. Reconsideration of this application is respectfully requested in view of the amendments and following remarks.

Claim Objections

In the Office Action, claims 9-11 and 20-22 were objected to because of lack of antecedent basis. Applicants have amended the subject claims to correct the antecedent basis. Accordingly, withdrawal of the claim objections is respectfully requested.

Claim Rejections under 35 U.S.C. § 103

In the Office Action, claims 1, 2-4, 8, 9, 11-15, 19, 20, 22, 97, 98, 100 and 101 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Application Publication No. 2005/0046373 to Aldred in view of U.S. Patent No. 6,167,332 to Kurtzberg. Claims 5-7, 10, 16-18, 21 and 99 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Aldred in view of Kurtzberg and further in view of International Application Publication No. WO02/075470 to Hulden. Applicants respectfully traverse these rejections.

Claims 97-101 are canceled. Independent claims 1 and 12 are currently amended. Support for the amended claim limitations may be found at paragraph 0161 of the specification.

With respect to newly amended independent claims 1 and 12, Applicants submit that neither Aldred, Kurtzberg nor Hulden, alone or the alleged combination thereof, discloses or suggests a robot cleaner, as recited in claim 12, or a method for operating a robot cleaner, as

recited in claim 1, comprising, *inter alia*, “determining which part of the map has a non-traveled cell; using the map to calculate a travel path to the non-traveled cell; using the map to determine if the travel path is free from obstructions; and if path is obstructed, rotating the travel path by a predetermined number of degrees ” and recalculating the travel path, and “if the travel path is not obstructed” moving the robot cleaner along the travel path toward the non-traveled cell.

More specifically, Aldred discloses an autonomous cleaning machine. When placed in a room and activated, the machine begins to navigate around the boundary of the room, continuously detecting the presence of the wall and maintaining the machine at a predetermined distance from the wall. See paragraph 0047. The machine continuously records information about the path that it takes in following the boundary of the room. See *Id.* The machine also plots the traveled path in order to construct a map of the working area. See paragraph 0049. Once the machine has established a good map of the working area the machine then begins the task of cleaning the entire floor area. See paragraph 0069. The basic technique that the machine uses to cover a floor area is a reciprocating scanning movement. See paragraph 0070 and FIG. 12. That is, from a start point, the machine follows a set of parallel straight line paths, each path being followed by a step across movement that positions the machine pointing back in the direction from which it has just come but translated one brush bar width across in the direction of the scan. See paragraph 0070. When the machine reaches an obstruction, “it proceeds to follow the edge of the object, cleaning around the edge of the object.” See paragraph 0087.

However, Aldred does not disclose that the map of the working area is divided into cells and that the cleaning robot determines which part of the map has a non-traveled cell, as recited in claims 1 and 12 of the present application. Aldred also fails to disclose that the cleaning machine uses the map to determine if the travel path is free from obstructions, and, if the travel

path is obstructed, rotating the travel path by a predetermined number of degrees and recalculating the travel path, as recited in claims 1 and 12 of the present application. In contrast, Aldred teaches that the cleaning machine covers the floor area in reciprocating scanning movements, by traveling in parallel straight line paths with each path being followed by a step across movement and cleaning around the edge of the various obstructions. See paragraphs 0070 and 0087. This approach differs significantly from the technique claimed in amended claims 1 and 12.

Kurtzberg discloses a method for optimizing an operation of a self-guided vehicle. The vehicle creates a map of the encompassing region and its target destination using various sensors. See col. 3, lines 5-7. The system then superimposes a cell grid on the map. The location of the vehicle is in a particular cell and the target is located in another cell. The vehicle moves from cell to cell from its current location to its target location following a path of least resistance to its movement, as described below. See col. 3, lines 12-20. Specifically, the system constructs a weighted-edge graph from the cells. The nodes of this graph designate the cells and the connecting edges represent the linkages to adjacent cells that can be directly reached. See col. 3, lines 39-42. The root node of the graph is associated with the cell in which the vehicle is currently located. The task for the vehicle is to traverse from the root node to the target node i.e., the node representing the target cell, so as to minimize the sum of the weighted graph edges of the traversed nodes. See col. 3, lines 49-53. Computation of the minimum path tree establishes a connection from the root node to the target node. See col. 3, lines 66-67.

However, Kurtzberg does not disclose or suggest a cleaning machine that uses a map to determine if the travel path is free from obstructions, and, if the path is obstructed, rotating the travel path by a predetermined number of degrees and recalculating the travel path, as recited in

claims 1 and 12 of the present application. In fact, not only does Kurtzberg fail to disclose or suggest any automated method of dealing with path obstructions, it does not even mention the concept of obstructions. In contrast, Kurtzberg discloses that if the target node associated with the target cell is not reachable, the implication is that the graph containing the root node and the target node is not connected; that is, there is no possible path from the root node to the target node. Such information is supplied to the control base (e.g., humans). See col. 4, lines 8-13. This human-assisted approach to vehicle navigation differs significantly from the automated technique recited in amended independent claims 1 and 12 of the present application.

Hulden discloses an energy-efficient method for navigation of an autonomous cleaning apparatus. According to the method, the area is divided into cells, each of which is being indicated as cleaned, uncleaned or occupied by an obstacle. See page 12, lines 27-29. The navigation route to the uncleaned cell is determined using a predetermined energy cost function. See page 13, lines 6-8. The cleaning apparatus is then navigated to the uncleaned cell according to the navigation route. Preferably, the energy cost function depends both on the distance from the current cell to the uncleaned cell as well as the total change of direction required for moving thereto (i.e., a larger change of direction, a larger distance being given a larger cost). See page 13, lines 10-16. In other words, Hulden teaches that cells, cleaning of which requires the smallest amount of energy, are cleaned first, followed by the cells which require more energy.

This energy-based approach for determining travel path differs significantly from the technique recited in claims 1 and 12 of the present application in which the cleaning machine uses a map to determine if the travel path is free from obstructions, and, if the path is obstructed, rotates the travel path by a predetermined number of degrees and recalculates the travel path, which has nothing to do with energy saving or other parameters mentioned in Hulden. At least

for these reasons, claims 1 and 12 as well as the claims dependent thereon are patentable over Aldred, Kurtzberg and Hulden, alone or the alleged combination thereof.

Conclusion

Accordingly, Applicants respectfully submit that claims 1-23 are in condition for allowance and a Notice of Allowability is earnestly solicited. If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact the Applicants' undersigned counsel at the telephone number, indicated below, to arrange for an interview to expedite the disposition of this application.

Respectfully submitted,

Date: January 5, 2009

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Attachment: Petition for Extension of Time
Request for Continued Examination